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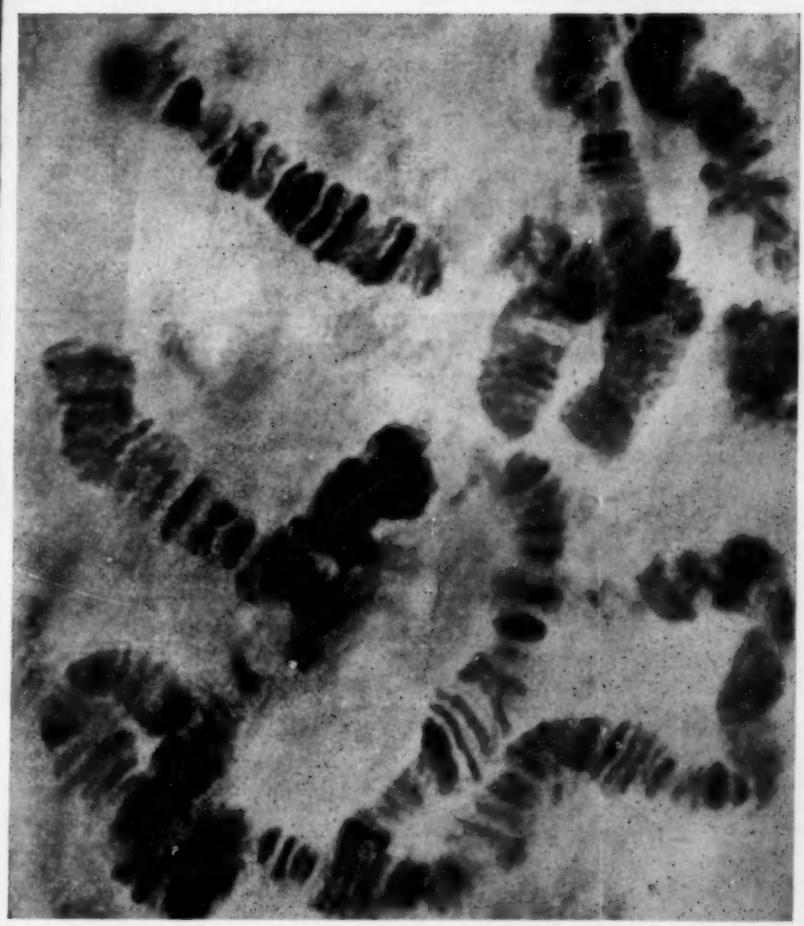
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



SEPTEMBER 29, 1934

The Chain of Life

See Page 195

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The Weekly Summary of Current Science

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DO YOU KNOW?

The industry of making sugar from wood by the well-known Bergius process is being encouraged in Germany.

Hand-painted wooden plaques found at Corinth shed new light on the variety of colors used by ancient artists there.

The British Broadcasting Company has abandoned its experiment of timing its programs by numbering the hours 1 to 24.

It is declared that the national parks hold out the last hope of preserving the grizzly bear from extinction in the United States proper.

The Department of Commerce and Industry in Japan has secured an appropriation to encourage production of motor fuel from coal.

The suggestion has been made in England that brightly colored automobiles promote safety, because they are more easily seen than dark cars.

A copperhead snake only six hours old can inflict a dangerously poisonous bite; so a scientist discovered when he let a baby copperhead bite him.

Government tests indicate that sweet corn scalded and frozen within four hours after picking will retain its fresh sweetness for six months or more.

Recent examination of the poet Dante's skull shows that the expression of his mouth was affected by the loss of upper incisor teeth in boyhood.

In Germany, light-weight sheepskin is being turned into a novel product, called woven leather, to be used for upholstery, handbags, shoes, and other articles.

The early physician Hippocrates observed that when symptoms of lockjaw develop ten days or more following a wound the patient is much more likely to recover than if lockjaw sets in promptly.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY

What use did primitive man make of the stingray's tail? p. 196.

ASTRONOMY

How far apart are the galaxies in the "archipelago of island universe"? p. 198.

AVIATION

How can the glider pilot gain altitude faster than he loses it? p. 202. *Gliding and Soaring—Percival White and Mat White—Whittlesey House,* 1931, 2.50.

BOTANY

Do ferns shed their leaves? p. 205. *Field Book of Common Ferns—Herbert Duran—Putnam,* 1928, $2.50.

CHEMISTRY

How light is the lightest powder in the world? p. 199.

What disease resulted from playing mah jong? p. 201.

What is made from propiophenone? p. 201.

What is the name of element 91? p. 206.

CYTOLOGY

Where did the chromosome get its name? p. 195. *The Theory of the Gene—Thomas Hunt Morgan—Yale,* 1928, $4.

ENGINEERING

Does the million dollar street car provide for straphangers? p. 197.

INDUSTRIAL MEDICINE

What does a good nose do for the stonecutter? p. 204.

MARINE ENGINEERING

What is the function of a boom? p. 196. *Sailing Craft—Edwin J. Scoettle—Macmillan,* 1928, $12.

MEDICINE

How is silicosis contracted? p. 197.

What effect has blood injection on sinus trouble? p. 206.

ORNITHOLOGY

How swift is the eagle's flight? p. 200.

PHARMACOLOGY

How many persons are using dinitrophenol for obesity? p. 198.

PHYSICS

What is the Hunt-Chittum effect? p. 199.

PHYSIOLOGY

How young can a girl bear a child? p. 200.

PSYCHOLOGY

Do mediums change their personalities while in a trance? p. 200.

Is it always a fault for a singer to sing off pitch? p. 204.

Is there a special skin mechanism for feeling temperature? p. 198.

PUBLIC HEALTH

How can botulism be prevented? p. 206.

What is the death rate from alcoholism? p. 200.

Why should milk dealers have their tonsils removed? p. 201.

ZOOLOGY

How can primates be standardized for research? p. 201.

These curiosity arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

CYTOLOGY

Subdivisions of Chromosomes Demonstrated by New Method

Making Hitherto Opaque Objects Transparent Lets in Light on the "Local Habitations" of Genes

See Front Cover

DEMONSTRATION of structural details within the chromosomes, considered by most biologists to be the bearers of the "genes" that control the inheritance of physical and physiological characters in animal and plants, compares in importance with the demonstration a few years ago of the divisibility of the atom into smaller electrically charged particles. Like the atom, the chromosome was suspected of being made up of distinct functional units on theoretical grounds for some time before the scientists' "hunch" was proved to be correct.

The brilliant work of Dr. Calvin B. Bridges of the Carnegie Institution of Washington, carried on at the California Institute of Technology and lately in the genetics laboratories of the Carnegie Institution at Cold Spring Harbor, N.Y., in making clearly visible the separate units of which the chromosome is composed, depends upon a paradox. For to see the chromosome-units distinctly it is necessary first to get out of the way the very stuff that gave the chromosome its name. The name "chromosome" is derived from the Greek for "color body," and was given to these small structures within the cell nucleus when it was observed that they became darker than the rest of the protoplasm upon the application of certain stains to make details of nuclear structure visible.

Banded Giant Chromosomes

The chromosomes were at first assumed to consist of a uniform substance, which was given the name chromatin. There was even developed a series of special chromatin stains for the purpose of making the chromosomes darker and more strikingly outstanding in the microscopic view of the cell.

A brilliant lead, to which Dr. Bridges acknowledges indebtedness, was developed during 1933 by Prof. T. S. Painter of the University of Texas. Prof. Painter worked with the "giant" chromosomes found in the salivary gland cells of fruit-fly larvae, which are seventy times the size of ordinary chromosomes.

He found on them numerous cross-bandings, which always had the same sizes and spacings on comparable chromosomes. He found also that with particular groups of these bands, groups of known genes could be correlated. This constituted the first truly quantitative, accurate gene-mapping ever accomplished.

When Dr. Bridges went to work, with Prof. Painter's results before him, he strove first to penetrate the veil of the chromatin. He developed a method to see right through it, so that he could get at what was inside. The chromatin, it developed, was not the important part of the chromosome at all, but only the matrix, the outside wrapping.

Now that the contents were visible, it could be seen that what Prof. Painter had first described as bandings on the chromosomes were really the edges of solid disks that ran clear through the chromosomes, strung together like beads on a thread. It was seen also that each gene locus corresponded with some special size or shape of "bead," always in the same relative position and always the same in all chromosomes examined.

"As easily located as the houses on Main Street in the Old Home Town," is the vivid and homely characterization given by Dr. Bridges to the genes' places in the chromosomes.

The thick, somewhat snaky objects in the illustration on the cover are the chromosomes, thousands of times magnified. The many dark bands crossing them were invisible until Dr. Painter's and Dr. Bridges' work brought them out in sharp detail.

Chromosomes Divisible

But that was not the whole story. Not even the units of the now transparent chromosomes were the last words. They proved to be subdivisible also. Each disk is made up of a bundle of tiny rods, like a big handful of cigarettes; their ends are visible as dots on the faces of the disk. There is a continuity between these rods, from disk to disk; Dr. Bridges has likened them to segments of the strands in a twisted cable.

So small are these sub-units that many of them are hardly larger than single molecules of one of the more complex proteins. They may, indeed, be single molecules, or they may be small

HAVE FOUND THE HOME OF THE GENES

Following the lead of Prof. T. S. Painter (left), Dr. Calvin B. Bridges (right), has demonstrated subdivisions of chromosomes, bearers of hereditary units. This research is comparable with the demonstration a few years ago of the divisibility of the atom.

groups of molecules acting together.

Whether these tiny units are the genes themselves, or only the "genophores" or gene-bearers, is a matter of relative unimportance. The important thing is that they have now been unveiled, so that the searching finger of science may probe a little further into the secrets of life.

The principal milestones in the development of modern genetics may be listed as four: Gregor Mendel's proof, three generations ago, that genetic units determine the inheritance of characters; Otto Bütschli's demonstration of the existence of chromosomes; Thomas Hunt Morgan's concept of the gene; Painter and Bridges' separation of the chromosome into its finer structural units and their correlation with the location of the genes.

Science News Letter, September 29, 1934

MARINE ENGINEERING

Science Aided the Endeavour In Her Race for the Cup

"New-Fangled Gadgets," Including a Triangular Boom And Instrument Board With Stress Meter Helped

SCIENCE and mechanics can claim their share of credit for the showing of the British yacht *Endeavour* in the races for the America's Cup off Newport, R. I.

Old salts may shake their heads over instrument boards for yachts, triangle booms and all the other "gadgets," but both cup contestants have their share of them. A large part of the job of the scientists in the afterguards of both cup racers is devoted to the perfection and maintenance of "new-fangled" mechanical helpmates to the art of sailboat navigation.

To any yachtsman a boom is—or perhaps it is better to say, used to be—a piece of wood to which the lower edge of the mainsail was attached with rings. The boom rotated about the mast and by setting it at different angles the maximum velocity through the water was obtained.

Not on Endeavour

But on the *Endeavour* the boom is not just a cylindrical length of wood; it is triangular in cross-section. Such a triangular boom is a three-sided structure of wood with a flat side just under the edge of the mainsail. Rings attached to the "foot" or bottom of the sail slide along metal rods on the boom and set in it at right angles to its axis.

As the yacht tacks the rings slide along the rods and allow the foot of the sail to assume the best aerodynamic curve. Said another way, the sail takes a "set" which brings about the least "spilling" of air from it and hence the maximum driving force.

Convenient to the helmsman on the *Endeavour* is the instrument board of the vessel containing instruments for telling wind velocity and wind direction, and a mechanical log, or speed indicator of the yacht relative to the water.

Hot Wire Anemometer

The wind indicator is known technically as a hot wire anemometer, working on the Wheatstone bridge principle. Its workings are not as complicated as its name. Two equal resistance wires have a given electrical current passing through them. One resistance wire is shielded from the wind; the other is exposed to it. The cooling of the exposed wire changes its current-carrying capacity and throws the hitherto balanced Wheatstone bridge circuit out of balance. The out-of-balance current registers on a meter whose dial is before the helmsman. The out-of-balance current varies in proportion to the wind velocity.

The wind direction indicator is a rigid racing pennant acting as a weather vane high up on the peak of the main mast. Variations in its position control an electrical circuit acting on a voltmeter on the instrument board which is calibrated in wind direction.

Still another device is a stress meter giving the helmsman continuous knowledge of the forces acting on important bracing cables in the rigging. When the forces reach a point where there is a possibility of their breaking vital stays in the rigging the suitable ropes may be "eased off."

Science News Letter, September 29, 1934

ARCHAEOLOGY

Prehistoric Java Race Had Tools Like Neandertaler's

HOMO *soloensis*, a prehistoric race that lived in Java 40,000 years or more ago, had tools and weapons resembling those of Neandertal Man in Europe. This is the conclusion of Dr. P. V. van Stein Callenfels, based on a study of a large collection of such implements of stone, bone and horn collected on a terrace of the River Solo. This terrace was apparently formed during pleistocene or Ice Age times. The animal bones found associated with the relics of human occupation included an extinct elephant, a hippopotamus, and other animals no longer known in Java.

Striking among the implements found on the Solo terraces are a notched bone harpoon, showing a high degree of workmanship, and several of the barbed spines from stingray tails, which apparently were used as dart or arrow points, as they still are used by some island tribes. These spines argue the existence of trade between the hill-dwellers on the river terraces and the shore-dwellers of the coast, far back in cave-man times.

The stone tools and weapons include no flints, for flint is not found on the island of Java. Instead, this ancient race used chalcedony, chipping and flaking at least the better pieces with as much skill as did Neandertal man in Europe, at the culture level known as Mousterian.

Although *Homo soloensis* and his handicrafts are known from specimens found along the same river whose gravels yielded the much-discussed skull, teeth and thighbone of *Pithecanthropus erectus* something over forty years ago, Solo man is considered a far more advanced race than *Pithecanthropus*, and probably much later in time. His head was much larger and more highly domed, although still possessing the very heavy eyebrow ridges characteristic of Neandertal man in Europe and Peking man on the Asian mainland.

As yet, no artifacts assignable to *Pithecanthropus* have been found, so that a culture comparison between these two ancient Javanese races is not possible.

Science News Letter, September 29, 1934

Rainfall may wash 21 times as much plant food from the soil as growing crops would consume.

ENGINEERING

Million Dollar Street Car Banishes Many Annoyances

A NEW street car representing four years of research and a million dollars in cost was exhibited in Cleveland. The car is a street car rider's dream of the millenium. Every avoidable annoyance incidental to transport by urban electric car has been removed from the new development.

Forced ventilation is supplied, the seats all face forward and are of the familiar motor-bus type: deep, soft and upholstered at side and back in leather. The windows really move; not by two-handed brute force with the help of a crowbar, but like windows in automobiles. The first high step getting into the car has been replaced by stairs like those of the home. Wherever one stands in the car there is a handrail or grip so near that not even one step is necessary to reach it. Lighting is indirect and provides three times normal street car illumination, without glare.

Noise is diminished within the car by replacing steel coiled springs with rubber pads. The wheels are resilient; a combination of steel and rubber so designed that they transmit less vibration and noise than formerly.

Construction of the car was in the hands of Prof. C. F. Hirschfeld, nationally known engineer and chief of the research department, Detroit Edison Co. He had had, however, no experience in designing street cars. Starting "from the ground up" his first thought was to talk with many street car riders and find out all the things about this form of transport which they did not like. Afterwards he went to the electric railway companies studying economical operation and finally to the manufacturers to have the many ideas worked out.

The new street car will accelerate about twice as rapidly as has been customary. Yet it can do this far more smoothly than do present street cars.

Not only will this improved speeding up decrease the running time for a multi-stop route, but engineers believe it will reduce accidents at traffic stops. At present, it is explained, automobiles can accelerate faster than a street car from a standing start. As a result, drivers like to cut over to the car tracks in front of the car as both get under way. With faster acceleration in the new car, 10 per cent. more than that possible in automobiles, it is believed motor cars will be unable to cross over to the tracks because the street car will already be there.

Finding that rubber tires for street car wheels would not, in their present stage of development, stand the strain of service the development engineers have produced a resilient wheel made of steel parts interlocked with rubber.

To reduce the transmission of vibration from the trucks up to the car body, rubber springs instead of steel springs are used.

Science News Letter, September 29, 1934

MEDICINE

Treatment of Silicosis With Alkalies Attempted

THE USE of alkalies like sodium bicarbonate for the treatment of silicosis, lung disease which sometimes afflicts miners and other workers in dusty trades, has been tried by Earl J. King and Margery Dolan of the department of medical research, Banting Institute at the University of Toronto.

The results of this form of treatment were too erratic for any conclusions to be drawn, the investigators reported to the Canadian Medical Association.

The treatment was based on their observation that when silica, either in solution or as powdered quartz, gets into the blood stream from the digestive tract it is quickly eliminated by the kidneys. The same thing occurred when solutions of silica were injected directly into the veins. The body apparently has a very efficient mechanism for disposing of silica once it has entered the blood stream in soluble form.

Silicosis, however, is a disease produced by inhalation into the lungs of very fine particles of silica. Studying this aspect, the Toronto investigators found that when silica in solution was introduced directly into the lungs of experimental animals, two-thirds of the silica was eliminated from the body. When finely-powdered quartz dust, such as would be inhaled in dusty atmospheres, was introduced into the lungs, a little less than two per cent. of the amount of silica given was eliminated.

These experiments seemed to indicate that the body fluids circulating in the lungs could dissolve silica even when present in the form of highly insoluble crystalline fragments of quartz.

Tests on miners and on healthy laboratory workers who had been exposed to a large amount of quartz dust for a day showed, as might be expected, that they were actually eliminating more than the normal amount of silica. Evidently the mildly alkaline tissue fluid in the lungs was dissolving some of the silica inhaled and as a result it was getting into the bloodstream and being eliminated.

In the hope of accelerating this natural effort of the body to rid the lungs of disease-producing silica, the investigators tried giving alkali medicines. Results, however, were inconclusive.

Science News Letter, September 29, 1934

MILLION-DOLLAR STREET CAR

ASTRONOMY

Discovers an "Archipelago Of Island Universes"

VISION of "stars innumerable as seashore grains of sand," in a tremendous archipelago of "island universes," was flashed before the meeting of the American Astronomical Society at Connecticut College, New London. Dr. E. F. Carpenter, director of the Stewart Observatory of the University of Arizona, at Tucson, reported the discovery of a vast super-galaxy, a galaxy of galaxies, in the constellation of Hercules, near the boundary of the star-group known as the Northern Crown.

The magnitude of the newly-described super-galaxy may be grasped by first looking at our own. All the individually visible stars in the sky, and the vast host of other stars so remote that their swarming numbers merely blend as the hazy light of the Milky Way, constitute one galaxy—our "home" galaxy, of which the sun with its family of planets is an inconspicuous member.

Dr. Carpenter's "galactic archipelago" is made up of at least 250 units, each a vast galaxy like our own. Some of these are as much as ten thousand light-years in diameter. Although these galactic units are "closely packed" into their cluster, as astronomic packing goes, still there is an average of about one-sixth of a million light-years between neighboring "island universes." The whole archipelago is perhaps 1,500,000 light-years in diameter.

50,000,000 Light Years Away

A survey of the apparent brightness of the nebulae indicates that on an average each galaxy sends to earth only 1/25,000 as much light as the faintest star visible to the naked eye. Since each galaxy consists of many thousands of stars, some of them flaming giants, this very low apparent brightness means that the new-found super-galaxy is very far away. Dr. Carpenter estimates its distance at 50,000,000 light-years—fifty million times as far as light, speeding at 186,000 miles a second, can travel in a year.

Dr. Carpenter discovered the nature of the super-galaxy on a photograph taken with the thirty-six inch reflecting telescope at the Stewart Observatory. He examined older plates taken of the same region at other observatories, and found the cluster as an undefined faint object on two of them. But the details of structure did not show up. He is of the opinion that when the cluster is re-photographed with a still bigger telescope, like the hundred-inch instrument at Mount Wilson, the number of island universes in his archipelago will be increased, possibly to 300 or more.

Science News Letter, September 29, 1934

PHARMACOLOGY

New Weight-Reducing Drug Should Be on Poison List

DINITROPHENOL, potent new weight-reducing drug, should be added to the poison list and its sale regulated so that it can be obtained only on a physician's prescription.

This step was urged as a safety measure by Drs. M. L. Tainter, W. C. Cutting and A. B. Stockton at the meeting of the American Public Health Association. These Stanford University scientists were the first to report the use of the drug as an obesity remedy.

"Probably at least one hundred thousand persons have been treated with the drug in this country alone," Dr. Tainter declared in reviewing the results obtained with the remedy since he and his colleagues first studied its possibilities in 1931. It has also been used in Canada, Great Britain, France, Sweden, Italy and Australia.

Three deaths have been reported from its use. One was in a psychiatric patient and there is some doubt in Dr. Tainter's mind as to whether the drug was the cause of this death. The other two were a physician who took two tremendous doses and a girl who bought the drug on her own responsibility from a druggist and took a very excessive dose. Excessive amounts of the drug cause death by producing a fatally high fever.

A possible means of treating this dangerous fever was suggested by Dr. Tainter who said that in animals, at least, the fatalities from the fever of dinitrophenol can be prevented by chilling the skin with ice packs and by giving oxygen inhalations.

The main disadvantage to the medical use of the drug is the very alarming and unpleasant skin rash which it sometimes produces. A saving feature is that about half the patients who have had one such skin reaction are able, after a short interval, to continue the treatment without further difficulty.

Dr. Tainter and colleagues were unable to find that the drug, in proper dosage, had any harmful effect on liver, kidneys, blood, digestive tract or blood pressure or circulation. Patients with high blood pressure can be treated like other patients, and as they lose weight the blood pressure is usually lowered and the accompanying symptoms of that condition improved. There is always a possibility that some persons may have an idiosyncrasy for the drug and in these patients harmful effects might be produced by even the correct doses.

Because it is such a potent remedy Dr. Tainter urged not only that its use be limited to physicians but that even doctors should not use it until every other remedy for reducing weight, including careful dieting, had been tried.

Science News Letter, September 29, 1934

PSYCHOLOGY

Blood Vessels Aid In Feeling Temperature

YOU FEEL a flatiron as hot or a piece of ice as cold not because of the action of a special temperature mechanism in the skin but through the action of your blood vessels. The heat dilates or enlarges your blood vessels, while cold, on the other hand, contracts them. This theory, opposed to the commonly held one of a special skin mechanism for feeling temperature, was proposed to the American Psychological Association meeting in New York City by Dr. John P. Nafe of Washington University, St. Louis, Mo.

The cornea of the eye, which contains no blood vessels, cannot feel temperatures, Dr. Nafe reported. The fact that warmth is perceived gently as a gradual flowing in, while cold seems sharp and quick, also points to the origin of the sensation in the blood vessels, he believes. When you place your left hand in cold water, the blood vessels in your right hand also contract and within three seconds your right hand becomes more sensitive to heat and less sensitive to cold, Dr. Nafe has found.

Science News Letter, September 29, 1934

PHYSICS

Theories of Conduction Upset by New Discovery

Current Found to Persist in Conducting Solution For Fraction of Second After Circuit is Broken

A DISCOVERY which may upset theories of how a conducting solution can carry an electric current is announced by Drs. Herschel Hunt and Joseph F. Chittum of Purdue University. The theories held at present date back to the work of Michael Faraday in the early years of the last century.

The Purdue investigators, for the last eight months, have been studying a queer phenomenon. They find that when the external source of electric current through a conducting solution is removed the current does not immediately stop, as present-held theory predicts. Common conducting solutions in everyday use include the acidic solution in an electroplating bath and the fluid in an automobile battery.

The strange, and hitherto undetected, effect has greatly interested scientists. Dr. Irving Langmuir, Nobel prize winner from General Electric Company's research laboratories, has suggested new lines for future experiments. Movement is underway to provide funds for research fellowships for further study.

The new discovery—called tentatively the Hunt-Chittum effect—indicates that for a short space of time, from a tenth of a second to one second, after the external current in the circuit is broken, electrochemical action continues in the solution. Electric current can be detected there without an external electric "driving force" of battery voltage being present.

To detect the small persistent current, Drs. Chittum and Hunt used as electrodes two tiny wires which can be moved about in the solution. Using such "electrical probes," they have observed the residual or persistent current under many conditions.

One strange experiment was to float, on the surface of the conducting solution, a metal vessel which was one terminal of the detecting circuit. The other terminal of this same circuit was a wire suspended in air, inside the floating vessel. Current was passed through the electrolyte bath. A thousandth of a second after this current was cut off the detecting circuit was put into operation and current was found to flow in it.

The amazing part of this test was that some of the current had to pass through the air to complete the detecting circuit. Yet there was no known voltage applied externally. Seemingly it has to come from within the electrolyte bath through electrochemical activity.

What importance the new discovery will have practically is yet unknown. At present its theoretical value in physics and chemistry outweighs practical uses. Yet studies of how electricity is carried in conducting solutions—the whole basis of the electrochemical industry—may lead to new applications.

While suggesting several possible means of explaining the strange phenomenon, the Purdue scientists offer no explanation as final.

"Because of the newness of the phenomena," they declare, "and the vastness of the experimental data, an explanatory theory adopted at present could not hope to be long-lived."

Science News Letter, September 29, 1934

CHEMISTRY

Silica Fluff is World's Lightest Known Powder

SILICA fluff, a rare, white, finely divided powder and the world's lightest material of its type was shown at the meeting of the American Chemical Society. Silica fluff is only one-fortieth as heavy as water and less than one-third the weight of cork.

The specimen of the light powder which chemists have tried to make for years without success, was exhibited by Prof. C. A. Jacobson of West Virginia University. Whether the sample Dr. Jacobson owns was a chemical freak or accident or not; it is certain that science has been unable to duplicate the conditions which turned out the original product fifteen years ago at Johns Hopkins University.

Silica fluff, Dr. Jacobson declared, consists of minute flakes of silica. In each flake are millions of tiny air bubbles so small that the high magnification in a microscope is necessary to see them.

WORLD'S LIGHTEST POWDER

Dr. C. A. Jacobson, chemist of West Virginia University is not pouring milk into the container. The free-flowing substance is silica fluff, world's lightest known powder.

The strange material has such an affinity for air that when the dust is shaken up in a bottle it behaves like a liquid, flopping and splashing from side to side. It can be poured through a small funnel and fumes in the receiving vessel like a liquid.

Dr. Jacobson told his fellow chemists that silica fluff may be a man-made chemical analogue of the strange substance called diatomaceous earth. The latter consists of the mineral remains of incalculable masses of single-celled organisms which inhabited prehistoric seas millions of years ago. Such tiny animals contained dissolved silica. When the animals died the silica remained to last through the eons of geological time which have elapsed since their death.

Natural deposits of diatomaceous earth were formed in Maryland, Virginia, Alabama and California when those regions were probably the bottoms of prehistoric oceans. It is used as an absorbent for nitroglycerin in making dynamite, also as a wood filler and in polishing powder.

Silica fluff might have some of these commercial uses. But first science must rediscover the lost secret of making it.

Science News Letter, September 29, 1934

PSYCHOLOGY

Trance Mediums Take Personality Tests

EFFORTS are being made in England to give psychology tests to those elusive personalities that emerge when psychic mediums go into trance states.

While three well-known mediums agreed to take the first tests, the actual testing procedure turned out to be far from a routine, clock-work affair.

Results of these tests have been reported to the Society for Psychical Research by Whately Carington. He stated that one woman medium had such erratic electric resistance of her skin that the galvanometer, used to measure "excitement" in psychology tests, failed to produce a record that could be interpreted. Another subject, a man, did not fully cooperate.

Mr. Carington aimed to compare the personalities of the mediums in normal state and in trance by noting their associations with test words and by observing which words and ideas caused excitement.

In two of the mediums, he reported that the normal personalities and the trance personalities were significantly different. In one case, that of Rudi Schneider and his trance personality called Olga, he found the similarities more remarkable than the differences.

Science News Letter, September 29, 1934

PHYSIOLOGY

Girl Was a Mother At Age of Seven Years

THE eleven-year-old Tennessee girl who is reported to have borne a child is not the youngest mother on record. The world's record is probably held by a little Mohammedan girl of Delhi, India, who gave birth to a fully developed child at the age of seven.

This child, according to the report of the case made by Dr. Hilda L. Keane of the Victoria Zanana Hospital, Delhi, to the *British Medical Journal*, was brought to the hospital suffering from an abdominal tumor. Her father said the girl was seven years old and this proved, on checking with the health authorities and the municipal record of her birth, to be her correct age.

Examination showed that she was not suffering from a tumor but was about to become a mother. A Caesarean operation was performed and a living baby girl, weighing four pounds and three ounces, was born. The baby was not premature, Dr. Keane stated. The little mother suffered from fright during the first three days after the birth of her daughter, but otherwise recovered perfectly and was able to nurse her child for nine months. At the end of this period the baby weighed a little over eleven pounds.

In India cases of girls becoming mothers at the age of ten are not uncommon, medical authorities state. In warm climates generally both boys and girls mature at an early age. Most cases of early motherhood occur in girls who are well developed physically and have matured sexually far beyond the normal for their chronological age. But the young Mohammedan mother apparently was still a little girl in development and size. She was three feet eleven inches tall at the time her child was born and weighed 48 pounds. She still had almost all of her milk or baby teeth.

Science News Letter, September 29, 1934

PUBLIC HEALTH

Alcoholism Deaths Rise Slightly Since Repeal

DEATH rates due to alcoholism since repeal have decreased slightly among white Metropolitan industrial policyholders, but increased slightly among the colored.

Although alcoholism is a minor cause of death, both among the insured and the general population, the first half year of the Metropolitan Life Insurance Company statistics since the end of the prohibition era show that this year the rate among the colored policyholders was double that of the corresponding first six months of last year, 4.9 deaths per 100,000 compared with 2.4 per 100,000. Corresponding rates for whites dropped from 2.2 in 1933 to 2.0 in 1934. The combined figures showed a slight rise from 2.2 in 1933 to 2.3 in 1934.

New low death rates for tuberculosis, diphtheria and diseases of pregnancy and childbirth for 1934 are expected by Metropolitan statisticians on the basis of the first half year's record.

The outstanding unfavorable development in 1934's health picture is an abrupt rise of 15 per cent. in the pneumonia death rate. Measles is double last year's rate and whooping cough nearly double, but these increases are not particularly significant because the rates are still extremely low.

Science News Letter, September 29, 1934

IN SCIENCE

FORESTRY

Trees' Consent Needed For Successful Forestry

FORESTERS must consult something besides their own desires and the tastes of the ultimate timber consumer, if their cultivated forests are to be successes. They must admit the trees themselves to their councils.

If trees are thrust into soil not suitable for their roots, or subjected to climates to which they are not adapted, they will take revenge upon the foresters by not being profitable.

Points to be heeded by the careful forester were indicated before the meeting of the botanical section of the British Association for the Advancement of Science, by its president, Prof. A. W. Borthwick, of the University of Aberdeen.

Prof. Borthwick does not expect results from efforts to grow trees in even-rowed "pure stands."

"When man interferes too much with nature," he said, "she inevitably replies by countering his efforts, unless they comply within certain limits to natural laws. The endeavour to grow pure forests of trees on wide areas, in dense, uniform, even-aged masses, irrespective of changes in soil conditions and climate, is not in accordance with natural laws."

Science News Letter, September 29, 1934

ORNITHOLOGY

Eagle's Flight Timed At 120 Miles An Hour

"SWIFT as an eagle in its flight" means about 120 miles an hour.

That, at least, was the speed attained by a golden eagle observed in the Scottish mountains by Dr. F. Frazer Darling, who had an opportunity to time the bird over a three and one-half mile course. At the same time the eagle made an altitude gain of a thousand feet.

Dr. Darling has reported the details of his observation to *Nature*.

Science News Letter, September 29, 1934

NCE FIELDS

PUBLIC HEALTH

Tonsil Removal Assures Pure Milk

REMOVAL of tonsils has been found a successful means of solving the problem of carriers of the dangerous streptococcus organism among workers in dairies, Dr. C. W. Bonynge of the Milk Commission of the Los Angeles County Medical Association reported before the meeting of the American Public Health Association at Pasadena.

Epidemics of septic sore throat have been traced to milk infected by dairy workers who carried the organism of the disease although they were not themselves ill.

Discharging the employees found to be carriers is not a practical method of handling this important public health problem, Dr. Bonynge pointed out, because they are apt to find new employment in other dairies that are not carefully inspected and certified.

Removal of tonsils cleared up the carrier condition among employees of dairies certified by the Los Angeles Milk Commission, Dr. Bonynge said. After the operation the carrier no longer harbors the streptococcus organism and can continue in his work at the dairy with entire safety to the public drinking the milk he handles. In some cases, the organism persisted in the patient's throat after operation, but this was found to be due to incomplete removal of the tonsils, or to the fact that other tissues in the throat were infected.

Science News Letter, September 29, 1934

CHEMISTRY

Versatile Chemical Plays Seven Roles

ONE of the strangest Jekyll-and-Hyde roles among the atoms was reported before the meeting of the American Chemical Society by Dr. Walter H. Hartung of the Sharp and Dohme Chemical Company of Philadelphia.

The multi-faced substance is known chemically as propiophenone. Chemists know accurately its composition, or atomic "skeleton." It is a chemical having a pleasing odor that lends itself to blended perfumes. But by changing the kind of atom "flesh" through chemical manipulation, scientists are able to produce thirteen different compounds, all active physiologically and representing seven different types of activity.

From propiophenone it is possible to build up two kinds of local anesthetics, a flavor suggesting licorice, a germicide eight times as powerful as carbolic acid, a chemical causing crying, and the stimulant ephedrine.

Propiophenone rivals other organic chemicals reported which, while having the same basic atom skeleton, are found in such widely different things as cholesterol, vitamin D, the bile acids, the sex hormones and cancer-producing coal tar products.

"While there is abundant evidence of relationship between physiological action and chemical constitution," declared Dr. Hartung, "our knowledge thereof is yet so elemental that we can not even yet vault the low hurdle raised by the chemical family descended from a simple substance like propiophenone."

Science News Letter, September 29, 1934

CHEMISTRY

Poison Ivy's Poison Same as That in Lacquer

POISON IVY and the plant that produces Japanese lacquer have the same toxic substance in them, Prof. G. Albert Hill of Wesleyan University, Middletown, Conn., told the American Chemical Society at its meeting in Cleveland.

Prof. Hill was able, after a long series of chemical manipulations, to isolate from the bark of the poison ivy plant the substance known as urushiol, first obtained by the Japanese chemist Majima from Japanese lac. Lac, the raw material for the familiar Japanese lacquer, is obtained from a tree belonging to the sumac family, of which poison ivy is also a member. During the mah jong craze a few years ago, numerous cases of lacquer poisoning were traced to game sets imported from the Orient.

Before he succeeded in extracting urushiol from poison ivy bark, Prof. Hill had tried to get it out of the leaves, but without success. He used up a total of 800 pounds of poison ivy leaves in his first experiments.

Science News Letter, September 29, 1934

ZOOLOGY

To "Standardize" Animals for Research

SCIENTISTS of the future, experimenting with anthropoid apes, may have their laboratory material standardized just as chemists do today. This is the prophecy made by Dr. Robert M. Yerkes of the Yale Laboratories of Comparative Psychobiology.

It will require years to achieve this ideal, Dr. Yerkes warned, but ultimately the investigator who wishes to study the behavior or physiological reactions of these man-like creatures may select a subject accompanied by a pedigree, life-history, and characterization. This is one of the primary objectives of the breeding colony maintained by Yale under the direction of Dr. Yerkes.

On May 1, 1934, the breeding colony consisted of three mature male chimpanzees, twelve mature females, four children, and ten infants under three years. Between May 14, 1933, and May 2, 1934, eight normal births occurred at the Station.

"Chemists habitually safeguard their results by using only chemically pure materials, whereas biologists commonly accept their subjects as accidentally or incidentally found," Dr. Yerkes said. "Many indeed are the risks and disadvantages of using, in an important inquiry, animals whose age or developmental status, sexual condition, disease history, or experience are unknown. Yet this is precisely the situation with respect to the prevalent use of infrahuman primates—not to mention other mammals—in our laboratories today."

Science News Letter, September 29, 1934

METEOROLOGY

Philippines Almost Got Japanese Typhoon

JAPAN'S disaster came very close to being the woe of the Philippines instead, scientists of the U. S. Weather Bureau informed Science Service.

Tracing reports of the moving center of the big storm, the meteorologists found that it originated over the open ocean southwest of the island of Guam. It moved toward the Philippines, but just before making land it suddenly veered, first north-northwest, then north-northeast, finally to bear its cargo of death and disaster to Japan.

Science News Letter, September 29, 1934

AVIATION

"Clipper Ships" of the Sky

Mail of the Future May be Carried Down the Skyway By Motorless Planes Soaring on Uprising Winds

By ROBERT D. POTTER

"AIRMAIL train departing for Philadelphia, Baltimore and Washington," drones the dispatcher's voice over the loudspeaker of the Newark airport. The crowd behind the guard fences strains its collective neck to watch the takeoff.

A sleek biplane, the "locomotive" of the "train," slowly gains speed for its takeoff into the light breeze. Four hundred feet behind it, on a light but strong towing cable, comes the Washington "mail car." Behind it, attached on 200 feet of cable is the Baltimore "car" and another 200 feet behind is the Philadelphia "car."

Without fuss the air train rises in the air and heads for Camden airport just outside Philadelphia. The "cars" in the aerial train are light weight gliders each with a pilot and 200 pounds of valuable mail.

Glider Cuts Loose

Over Camden there is no descent to the ground. The air train keeps its 100 mile an hour speed and heads for Baltimore and Washington. The Philadelphia glider simply cuts loose from its towing cable and sails gently to the ground. The cable swings for a moment from the Baltimore car, then shortens and finally disappears as the Baltimore pilot reels in its length.

Over Baltimore the uncoupling of the next glider occurs and in Washington the last glider descends to the ground. Down, too, comes the towing plane; for after all this is just a demonstration. It might just as well have continued on to Richmond.

Thus a commercial use for gliders is demonstrated to America.

Over in Russia the same scene of air trains soaring the sky is being re-enacted. The land of the Soviets envisions a day, not too far in the future, when trains of gliders will be shooting across frigid Siberia to the far-flung limits of the nation on the shores of the Pacific.

Russia with its vast distances sees in glider trains a swift, cheap transportation system to supplement its railroads. Glider trains need no costly roadbed or maintenance. Thousands of gliders can be built for the price of a single mile of railroad track. And the trained glider pilots make valuable, skilled recruits for the air force of Russia.

Gliding was the stepping stone from which man launched himself and learned to fly. Lilienthal in Germany, Chanute, Herring, Montgomery, and the Wrights in America, and Pilcher in England were among the pioneers who enabled man to build airplanes and fly even when skilled scientists with mathematics "proved" it could never be done.

Half forgotten now is the debt aviation owes to gliders and gliding. With airplanes a commercial success, gliders have been relegated to amateur sportsmen. There is reason to believe, however, that many airplane pilots who rush overhead at 150 and 200 miles an hour could learn plenty from gliders and gliding.

In analogy an airplane pilot is like the captain of a great ocean steamer with vast power at his command to drive through adverse weather conditions and forces of nature.

By the same picture a glider pilot, without a 200 horsepower engine ahead of him, is like the master of an old sailing ship; dependent wholly on the wind and weather for his safety and progress.

Navy Uses Gliders

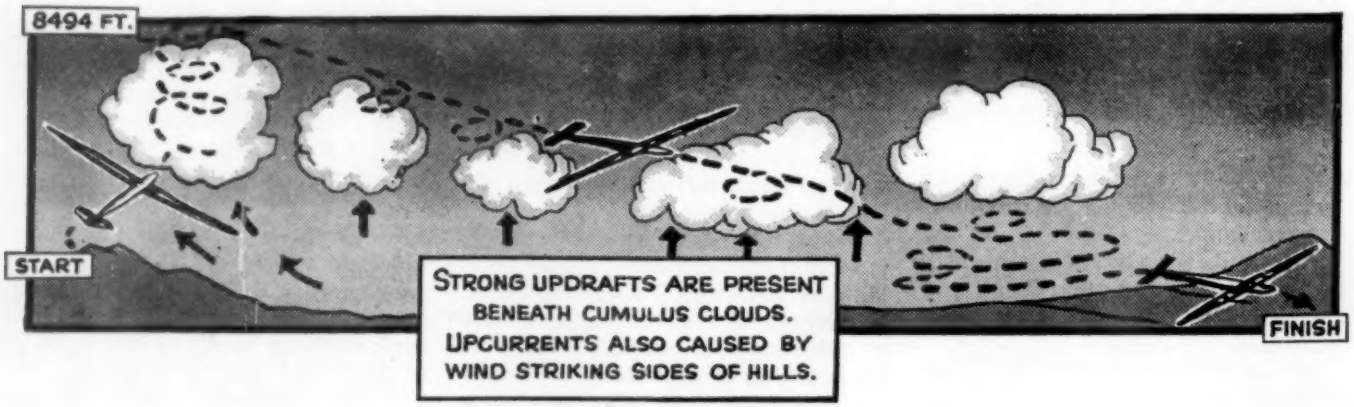
When the power fails in a great steamer whom would you rather trust; a seaman trained to read the weather and gain every advantage however small, which such knowledge brings, or one who knows only that if the boilers are kept filled with hot water and steam and a lever is pulled the ship will move?

Glider pilots fly and soar only because they know how to take advantage of uprising wind currents. They can gain altitude where airplane pilots without glider training can only descend. Even a three-foot difference in altitude may mean that one ship will glide over a treetop into a safe landing place beyond, while another will crash. The U. S. Navy is recognizing the value of glider training and uses them in preparing its future aviators.

Gliding is really divided into two categories; gliding and soaring. In glid-

HOW THEY KEEP ALOFT

Chart showing how the glider pilot takes advantage of clouds and ridges to give him altitude.


8494 FT.
START
FINISH
STRONG UPDRAFTS ARE PRESENT BENEATH CUMULUS CLOUDS. UPCURRENTS ALSO CAUSED BY WIND STRIKING SIDES OF HILLS.

ing, the plane lands at a point lower in altitude than the starting point. It starts from a hilltop, for instance, and lands at the bottom of a valley, traveling in a gentle glide all the way. In soaring, the plane takes advantage of rising air currents, gains altitude, rises higher in the air than the starting point and sometimes lands above it. Most flights are a mixture of gliding and soaring.

The increasing skill of glider design and glider pilots is best told, perhaps, in the records of gliding. Up until June, 1934, the world's gliding record for airline distance was 136 miles, made in 1931 by Gunther Groenhoff of Germany.

On June 16 Hans Fischer, also of Germany, soared and glided 149 miles. Nine days later, on the 25th, Richard du Pont, Jr., sailed away from the hills at Elmira, N. Y., and landed in Somerset, N. J., 158 miles distant for a new world's record.

The record stayed in America with du Pont hardly longer than Fischer's 149 mile record lasted in the face of du Pont's feat. On July 27, Wolf Hirth, famous German gliding expert, took off from the mecca of German gliding on the mountain known as Wasserkuppe and in the next six hours traveled 232 miles. The distance record has thus returned to Germany with some 74 miles to spare.

Germany, too, holds the duration and altitude records. Kurt Schmidt on August 3 and 4 in 1933 stayed aloft in a glider for 36 hours and 35 minutes. Robert Kronfeld has reached an altitude of 8,494 feet in a sailplane built especially for soaring.

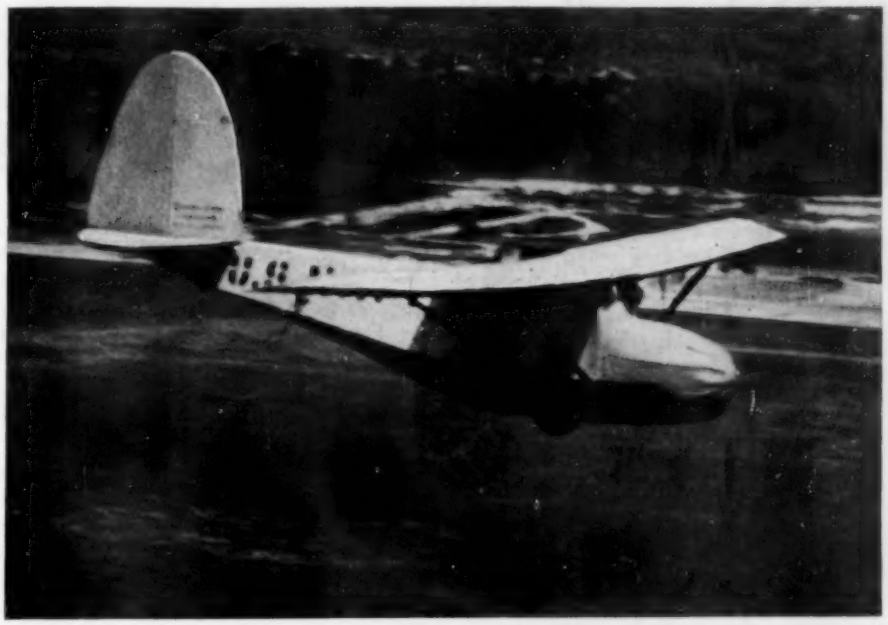
Mile and a Half Rise

By gliding, then, man has traveled farther than from New York City to Washington; stayed up in the air for a day and a half and gained an altitude of over a mile and a half. Not bad for a device without any motive power of its own.

How do they do it? Well built craft and skilled pilots are part of the story; nevertheless, breaking records demands propitious conditions.

The construction secrets that make possible breaking of records demand light-weight gliders, stable in even strong winds and yet sensitive to the slightest touch on the controls by the pilot.

Above all gliders need what the experts call a good angle of glide. This term simply means that the glider will travel a long distance horizontally for a given drop in altitude. Fifteen feet traveled forward for every foot lost in altitude is a common ratio nowadays. Thus to glide 300 feet a glider of this sort need only be 20 feet in the air.



RIDING THE WINDS

The Navy makes use of gliders to teach student fliers the delicate art of mastering the winds by taking advantage of all upward currents.

Soaring, the actual gaining of altitude, becomes possible when the upward air currents are gently raising the glider faster than the craft glides down. It is like trying to run down a fast moving escalator going upward.

If an upward wind raises a glider four feet a second while the craft must drop two feet a second to maintain stability there is a net gain of two feet each second upward.

For soaring, then, everything depends on finding air currents where there is a good steady updraft. The windward sides of mountains offer such conditions most of the time. That is why the favored gliding fields all over the world are situated on grassy meadows on hills or mountains that overlook valleys.

At such takeoff places the wind is simply deflected upward because the hill is in the way. But there are other spots where the sought-after upward air currents can be found. It is a knowledge of these conditions which makes possible the long distance flights by gliders.

What are the conditions necessary for soaring? One helpful air current is the type which rises from a plowed field which radiates heat better than the surrounding land. Above it, but invisible of course, there is usually an upward current of rising hot air. As a glider pilot travels cross country he must ever be on the lookout for such plowed lands and if nothing better in the way of wind conditions offers itself he will sail over it with a fair certainty that air currents will be rising and enable him to maintain or even increase altitude.

Better than the heat-caused rise of air from a field is the strong updraft of air beneath cumulus clouds. These are the great balls of fleecy vapor that often sail majestically about the summer sky. They mark the points where warm ground air rises until it reaches a height where its water vapor begins to condense into fog at the colder upper levels.

Watch For Clouds

Glider pilots watch for such clouds and in one way or another strive to get beneath them. Then by gliding back and forth in the updraft they can gain altitude. The trick often is one of hovering back and forth beneath a cumulus cloud until sufficient altitude is gained so that the pilot can glide over a range of hills en route to a record.

Suppose a pilot does gain what appears to be sufficient altitude for this step. Away goes the glider from beneath the cloud and away go the upward air currents. The craft does glide gently, as before, but now is losing alti-

tude. Will it pass over the ridge ahead? The pilot pushes the "stick" back to keep the glide at its maximum efficiency. Greatest forward distance for the least drop is the watchword. And yet the nose of the sailplane must not rise to a point where a stall will occur.

Yes, the bird-like machine and its human occupant are successful. Over the peaks of the ridge they go to reach the windward side. Now come the upward air currents again. The pilot turns the nose of the glider parallel to the ridge and executes great circles, ovals and figure-eights back and forth, gaining altitude and surveying the layout of land ahead. Twenty-five minutes or a half hour may be spent in such maneuvers if nothing better presents itself ahead. The next ridge of hills may be two miles away.

A Friend in Need

But here comes another friend; another cumulus cloud. Patiently the pilot weaves back and forth waiting for it to come overhead. The upward air currents coming over the ridge become even stronger.

Instead of hovering just above the peak of the ridge the glider now gains height. Five hundred feet above the ridge it soars. Then 600; finally 700. That ridge two miles away can be scaled if the glider is just a little less than 800 feet above it at the start of a long glide.

The experienced eye of the glider pilot finally tells him that the safe 800 feet height has been reached and away he goes to surmount the distant obstacle. And thus the aerial "hop-skip and jumping" goes on.

Above the Clouds

In exceptional cases a glider pilot may be able to take his ship right up into a cumulus cloud and in some cases above it. Such was the fortunate happening which enabled Robert Kronfeld to set the altitude record of over 8,000 feet. He went right up through a great cloud, emerged on top and then "hopped" his way from one cloud to another in a journey that covered ninety miles. For more thrills and hazards German glider pilots occasionally fly inside great thunderclouds.

Science News Letter, September 29, 1934

Decayed teeth were more prevalent among upper class Egyptians than among the peasants who ate simple, coarse foods, a study of ancient skulls shows.

PSYCHOLOGY

Even the Best of Singers Carol Off True Pitch

OPERATIC and concert singers, even the most noted artists, habitually sing off pitch. This was the charge made by Dr. Harold G. Seashore, Eastman fellow in psychology of music at the State University of Iowa, at the recent meeting of the American Psychological Association.

Such variations from the true pitch of a song are probably unconscious on the part of the singer, Dr. Seashore indicated, although they may not be errors, either. Certainly the listener hears the performance as correct and artistic; the variations are not detected by the ear. In fact, Dr. Seashore considers it probable that if the singer were to sing rigidly in true pitch, his performance would be considered thin, mechanical, and lacking in feeling.

The singers studied included such well-known concert and operatic artists as Richard Crooks, Louise Homer and Lawrence Tibbett, as well as two college voice instructors. The songs were in legato style and varied in difficulty from "All Through the Night" to two Handel arias. The voices were recorded by means of a sound photographing device called the strobophotograph which recorded graphically each variation in pitch and intensity, however minute.

The photographic records revealed that what is heard as a single note when sung by the artist is really a vibrato or oscillation between two pitches which may be as much as eight tenths of a musical step apart.

From 78 to 85 per cent. of all tones are off-pitch some of the time, with an average deviation of one tenth of a step, Dr. Seashore found.

Hunt For Pitch

"Apparently singers to a degree 'hunt' for the correct pitch and interval extent," Dr. Seashore said. He concluded, however, that the errors found are not due to motor skill deficiency or to auditory misjudgment, but are deviations necessary for the legato flow of the song.

Gliding attacks, or the sliding up to the note sung, were found to be more common than musicians are willing to admit.

"Gliding attacks are universally condemned although we can now demonstrate that all good singers sing many tones with a rising pitch glide, sometimes as great as several whole tones," Dr. Seashore said. With Miss Homer, 13 per cent. and with Mr. Crooks, 33 per cent. of all the tones in the songs were begun with rising pitch glide. Falling gliding attack was found to be rare.

Science News Letter, September 29, 1934

INDUSTRIAL MEDICINE

Persons With Good Noses Selected to Work in Dust

MINERS must have good noses. So must stone cutters, grinders, sand blast men, and others who work in an atmosphere laden with rock dust or other abrasive particles, if they would keep their health and avoid lung troubles. For an important function of the nose is to filter out these particles and prevent them from entering the lungs. And noses differ greatly in the efficiency with which they perform this function.

Dr. Gunther Lehmann of the Kaiser-Wilhelm Institute for Workman's Physiology examined 426 noses. They belonged to miners. Of the 426 miners, 241 were ill with lung troubles, 185 were well.

The noses were tested by blowing into them air laden with a fixed amount of dust, and allowing the air to issue from the mouth while the breath was held. The dust content of this air was then measured and the percentage of the original content filtered out by the nose was thus determined. The healthy miners were found prevailing among the high percentages, the affected miners among the low percentages.

Dr. Lehmann recommends that no man be admitted to a dusty job unless he passes such a nose test. Had this been done, he states, with the miners he examined, 205 out of the 241 that fell ill would have been saved from their illness. Under no circumstances, he insists, should mouth breathers be accepted for such jobs.

Science News Letter, September 29, 1934

GEOLOGY

Largest Cities Usually Have Softest Water

IF YOU live in a city of over 20,000 the chance of having soft water supplied to your home is better than for rural or smaller communities. The reason: Larger cities usually obtain their water from the surface—rivers, lakes or reservoirs. Smaller towns use ground water from wells. Surface water, generally, is about twice as soft as ground water.

This is one conclusion from the new report of the U. S. Geological Survey on water hardness in the United States, prepared by W. D. Collins, W. L. Lamar, and E. W. Lohr.

A study of public water supplies of 670 cities throughout the country, representing nearly 57,000,000 people and hence 46 per cent. of the total population, indicates that about four out of five people of the number investigated use water taken from the surface of the earth.

What makes water hard? Water hardness is due to the presence of soluble salts of calcium and magnesium which react with soap to form insoluble compounds. And when water is heated and concentrated by evaporation the calcium and magnesium salts separate out and form scale in vessels ranging in size from steam boilers to tea kettles.

In the home, the insoluble, soap-formed compounds are best observed as the housewife's enemy—the familiar ring around the bath tub. Of more economic importance, however, insoluble compounds raise manufacturing difficulties. Scale on boilers is one handicap. And dyeing industries suffer, as do commercial laundries.

Water hardness is expressed as the amount of calcium carbonate equivalent to all the calcium, magnesium and other metals present. It is reported as so many parts per million of water.

Really soft water, class 1, has from one to 60 parts of calcium carbonate equivalent per million of water. Tolerably soft water, class 2, ranges from 61 to 120 parts per million.

Class 3 varies between 121 and 180 parts per million of water. Nearly everyone notices the hardness of the water in this group. Finally, there is class 4, the really hard water group, having over 181 parts per million of water. It extends to over 600 parts per million in some communities.

In classes 3 and 4 water must be softened for laundry and steam boiler uses. Water works of cities in these classes provide for the immediate or future softening of the water.

Taking water hardness by states, the really soft water groups include the coastal New England and coastal Southern states with the exception of Florida, and the extreme northwestern states of Oregon and Washington.

In group 2 come the Middle Atlantic states, plus West Virginia, Kentucky, Tennessee, Arkansas, Louisiana, Idaho and Montana.

Group 3, the hard water region, takes in Ohio, Michigan, Wisconsin, Minnesota, Missouri, Oklahoma, Texas, and also Colorado, Wyoming, Utah, Nevada, and California.

Having the hardest water of all, group 4, are the wheat and corn belt states of North and South Dakota, Nebraska, Kansas, Illinois and Indiana. The arid states of Arizona and New Mexico also fall in this category.

The Geological Survey issues its investigations with the warning that too general conclusions must not be drawn from the figures for there is a considerable variation within each state. Moreover, the study includes only half of the nation's total population.

Science News Letter, September 29, 1934

RADIO

ASTRONOMY IN NAVIGATION

an address by

Dr. L. B. Andrews

Harvard College Observatory

Wednesday, Oct. 3, at 4:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

BOTANY

NATURE RAMBLINGS by Frank Thone

Patient Ferns

AUTUMN is a good time to pay attention to the ferns. We are kept pretty busy on our woodland rambles in spring and summer, and even during early autumn, trying to hold ourselves abreast of the rapid procession of the blossoming things. But when frosts have laid waste the petals and crippled the insects that make them worth producing, then we can turn our attention to the older relatives of the flowering plants, now consigned to seats below the salt by the hustling later comers.

The patient ferns have for the most part waited for us, too. Ferns do not shed their leaves as broad-leaved trees and bushes do, and while some of them, like the maiden-hair and the bladderwort, may have withered and curled beyond the possibility of examination, there are very many species that are true evergreens, holding their tough, strong little leaf-blades dark green and alive even when buried deep in snow. And there are others, like the royal fern and the spleenwort, that keep green in defiance of frost until really heavy cold weather strikes them, and then, though brown and dead, still hold their shapes well enough to be worth study.

Even when the vegetative leaves have all been struck down, there still remain those odd structures which many ferns produce, pre-Cretaceus analogues of flowers. "Fertile fronds," botanists call them; they bear clouds of spores that fly out like brown dust when you brush against them. You will find these among the sensitive ferns and cinnamon ferns. Others, like the Christmas fern, fashion their fertile fronds like the non-sporulating sterile ones, except that on the backs of the leaflets—perhaps only the leaflets near the tip—we find the little brown dots where the spores are borne.

Science News Letter, September 29, 1934

CHEMISTRY

Element 91 Independently Isolated in Chicago, Berlin

Scientists at Kaiser Wilhelm Institute of Berlin Used Five and a Half Tons of Radium Ore in Research

CHEMICAL isolation of the heavy radioactive element number 91 has been achieved independently in widely separated parts of the world. Element 91 is called protactinium by German scientists and protoactinium by the British.

While Dr. Aristid Von Grosse of Chicago University's chemistry department was describing his method of isolation before the recent meeting of the American Chemical Society, the German scientific journal *Naturwissenschaften*, contained an account of similar work performed at the Kaiser Wilhelm Institute of Berlin by Drs. Georg Graue and Hans Kading.

Like the American experiments of Dr. Von Grosse in collaboration with M. S. Agrusse, the German scientists obtained their protactinium from tons of radium ore residues taken from the world famous radium mine at Joachimstal, Czechoslovakia. Three tons of radium ore residues were shipped to the United States in the American experiments. The German investigators used five and a half tons for their work.

Half a Gram

According to the British science journal *Nature*, a compound was prepared —protoactinium potassium fluoride— which contained half a gram of the pure element. Dr. Von Grosse in his American work prepared one-tenth gram of pure protactinium.

Drs. H. Schuler and H. Gollnow at the Astrophysical laboratory at Potsdam used five thousandths of a gram of the German sample to study the spin of protactinium's nucleus. Their work is the first determination of the spin in the nucleus of radioactive elements.

Science News Letter, September 29, 1934

VITALISM
and
MECHANISM
A DISCUSSION
between
HERBERT V. NEAL
Professor of Zoology, Tufts College
and
JAMES F. PORTER
Being a survey of these opposing theories from the point of view of a scientist and a layman.
50 Cents
SHERMAN M. GOBLE
105 W. Adams St. Chicago, Ill.

MEDICINE

Injections and Heat Help Chronic Sinus Troubles

CHRONIC sinus trouble may be relieved by under-the-skin shots of blood, peptone, typhoid vaccine or other foreign proteins. Electrical treatments also help. Such treatments hasten recovery by repair work set up in the body, Dr. Ralph A. Fenton of Portland, Oregon, reported to the American Academy of Ophthalmology and Otolaryngology.

Dr. Fenton and Prof. Olof Larsell of the University of Oregon Medical School have been attacking the problem of chronic sinusitis both in the research laboratory and the consulting room.

Using cats as "test tubes" in their laboratory, they first found a method of reproducing in these animals the conditions found in infected sinuses in humans. Next they tried all the various methods to treat the disease in man.

Special vaccines made from the germs causing the disease in an individual case are unnecessary, they found. The same repair process could be stimulated and recovery hastened by injections of the animal's own blood or by injections of foreign proteins such as peptone solutions or typhoid vaccine.

Salt-free, high-vitamin and other special diets did not prevent well-nourished animals from developing chronic sinus disease when infected with germs from human cases.

In the consulting room, they found that X-ray treatments gave only slight temporary relief.

Patients suffering from sinusitis affecting both cheek bones were given diathermy treatments on one side only. They reported much improvement and examinations of the sinus lining on the treated side showed a speeding up of the repair process not seen on the untreated side.

The nerves on the side of the neck which control the blood supply to the nose play an important part in repairing the damage done to the sinus membranes by infections, the Portland physicians believe, because when they removed these nerves on one side of the cat's neck there was marked increase in congestion of the sinus lining on that side.

Their study also showed that tissue cells which have tried to carry away germs by the lymphatic drainage channels of the sinuses may cause inflammation and temporary blocking of these channels. Such a blockade by swelling may help to lengthen the duration of the sinusitis.

In their studies on the cats, they tried many valuable skin antiseptics but found them too irritating for use in the sinuses. Their use delayed healing. Mild, simple, non-caustic alkaline agents seem the best aids toward repair of the sinus membranes, they reported.

Science News Letter, September 29, 1934

PUBLIC HEALTH

Education of Housewives Urged to Prevent Botulism

PREVENTION of future outbreaks of botulism now depends on teaching housewives all over the country proper methods of canning foods.

Factory canned foods have not caused any outbreaks of this deadly food poisoning in America since 1925, Dr. F. W. Tanner of the University of Illinois reported to the American Public Health Association.

Unfortunately, some state agricultural extension services, newspaper bureaus and manufacturers of supplies for home canning are giving housewives inadequate information on how to can foods. As a result numerous outbreaks of botulism still occur every year, Dr. Tanner pointed out.

Public health authorities have brought commercial food canners into line so that their products are no longer dangerous. Their next step must be to see that information given the home canner is adequate.

Science News Letter, September 29, 1934

There are at least 32 of the known elements in sea water.

First Glances at New Books

Additional Reviews On Page 208

Medical Economics

THE COST OF MEDICAL CARE—Donald B. Armstrong, Louis I. Dublin and Elizabeth J. Steele—*Metropolitan Life Insurance Co.*, 61 p., free. This study of costs in the families of field employees of the Metropolitan Life Insurance Company was undertaken to furnish an independent check on the findings of the Committee on the Costs of Medical Care. For the most part, the findings of the two investigations are quite similar. Some but not all of the differences are due to differences in the composition of the two groups of families studied.

Science News Letter, September 29, 1934

Medicine

LANE MEDICAL LECTURES: BIOCHEMICAL STUDIES OF NUTRITIONAL PROBLEMS—J. C. Drummond—*Stanford University Press*, 106 p., cloth, $1.50, paper, $1.00. Medical students and physicians who were not fortunate enough to hear these lectures by an eminent English authority on nutrition will be interested in this publication, which is, however, too technical for lay reading.

Science News Letter, September 29, 1934

Education—Sociology

THE EDUCATION OF THE NEGRO IN THE AMERICAN SOCIAL ORDER—Horace Mann Bond—*Prentice-Hall*, 501 p., $2.75. This book describes conditions as they are today, with an introductory historical account of Negro education from the Reconstruction era to the present. That Negro children constitute America's "most unfortunate class" is the verdict of the author, who is the Dean of Dillard University. Constructive discussion of ways in which the situation may be improved is a feature of the book.

Science News Letter, September 29, 1934

Botany

FERNS OF THE NORTHWEST—Theodore C. Frye—*Metropolitan Press*, 176 p., $2.00. Compact, concise, cleanly illustrated, this book fills a need long felt by botanists all the way from Wyoming to the Pacific, and from British Columbia to central California.

Science News Letter, September 29, 1934

Zoology

THE FOOTPRINT SERIES: THE LION; THE BEAR; THE DEER; WILD SHEEP AND GOATS—*The Orthovis Co.*, 4 vol., 25c. each. Each of these little books contains several bichrome offset pictures and is provided with a suitable binocular viewing screen which produces a strikingly realistic stereoscopic effect. A brief text, simple but not offensively "written down" supplies continuity.

Science News Letter, September 29, 1934

Dendrology

TALKING LEAVES—Julius King. Illustrations by Evan Thurber—*Harter Pub. Co.*, 62 p., 10c. plus postage. The very attractive format of this little book, showing specimen twigs printed in green against an inch-scale background, together with habit pictures and distribution maps, will recommend it to scout leaders, nature study teachers, and wander-birds generally.

Science News Letter, September 29, 1934

Physiology

WHAT ABOUT ALCOHOL—Emily Bogen and L. W. S. Hisey—*Scientific Education Publishers*, 112 p., $1.50. In readable text, persuasive abstinence arguments based on "facts divorced from propaganda" are presented. School children who are allowed to read this book instead of the preachy, scary temperance material of pre-prohibition days are fortunate.

Science News Letter, September 29, 1934

Psychology

FAITH, FEAR AND FORTUNES—Daniel Starch—*Richard R. Smith*, 226 p., $2.00. A psychologist's view of what lies behind this depression and others past and to come. The remedy, he suggests, lies not so much in control of prices, control of production, control of credit and control of money as in control of the national psychology. A chapter is devoted to the "Psychology of the New Deal."

Science News Letter, September 29, 1934

Dendrology

NORTH AMERICAN TREES—Samuel J. Record—*Field Museum of Natural History*, 119 p., 50c. Although designed primarily as a guide to the collection of North American tree specimens in the Field Museum, this little book can profitably travel in woods many hundreds of miles from Chicago. It tells briefly and understandably the principal facts about our principal trees, and supplements text with clean-cut line illustrations.

Science News Letter, September 29, 1934

Narcotics

TRAFFIC IN OPIUM AND OTHER DANGEROUS DRUGS FOR THE YEAR 1933—*Govt. Print. Off.*, 82 p., 10c.

Science News Letter, September 29, 1934

Botany

COMMON WEEDS—Paul C. Standley—*Field Museum of Natural History*, 31 p., 25c. Although professing to be of use only in the city of Chicago, this booklet can with profit be carried about in one's pocket in practically any town in the United States, at least east of the Sierras, for town weed floras, like town tramp faunas, are remarkably uniform in their makeup.

Science News Letter, September 29, 1934

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First Glances at New Books

Additional Reviews On Page 207

Ethnology

THE DIABOLIC ROOT — Vincenzo Petrullo—*University of Pennsylvania Press*, 185 p., $2. Writing under an ironic title, Dr. Petrullo gives us an account of what the Indian peyote religion is about. It is hard to write about the peyote plant, its effects on mind and body, without bias. There has been much excited denunciation of this Indian cult, without enough understanding of the facts. Dr. Petrullo has approached the problem as he would any other ethnological study. Making friends with the Delawares, he was admitted to peyote ceremonies, and the Indians talked freely to him about their religion. There are still facts to be learned about peyote, but the situation is clearer, thanks to this report.

Science News Letter, September 29, 1934

Pathology

MICROBIOLOGY AND ELEMENTARY PATHOLOGY—Charles G. Sinclair—*F. A. Davis*, 377 p., $2.75. Second edition of a textbook for student nurses. In simple, clear terms the chief disease-causing organisms are described, together with the changes they produce in the body.

Science News Letter, September 29, 1934

Histology

A TEXTBOOK OF HISTOLOGY—E. V. Cowdry—*Lea and Febiger*, 503 p., $5.50. A text for medical students which aims to relate structure and function in the whole body. Although Prof. Cowdry believes the students are "beyond the picture book stage" and should learn from study of body tissues themselves, his book is profusely and beautifully illustrated. There is a bibliography as well as an index.

Science News Letter, September 29, 1934

Radio

MEASUREMENT IN RADIO—F. H. Lumley—*Bureau of Educational Research, Ohio State University*, 318 p., $3.00. One's first thought on picking up this book and reading its title is "Oh, here's another of those volumes on how to measure volts, watts and amperes." Actually the book tells the relative merits of all the schemes by which radio broadcasters and advertisers attempt to weigh a program's appeal to the public. And how a given performer's popularity with the public may be judged. People who do not sponsor radio programs or run radio stations will find the greatest appeal in the chapter on "Psychological Factors in Listening," which tells what radio audiences remember about a program and why.

Science News Letter, September 29, 1934

Petroleum

THE CHEMISTRY OF PETROLEUM DERIVATIVES—Carleton Ellis—*Chemical Catalog Co.*, 1285 p., $18.00. Encyclopedic volume covering all the literature, both in industry and pure science, on the thousands of substances derived from crude petroleum. Included also is patent information on the subject seldom located without much effort. The volume should be a standard reference in the field for years to come.

Science News Letter, September 29, 1934

Land Use

THE REHABILITATION OF THE FLORIDAN KEYS—John C. Gifford—*University of Miami*, 79 p., 50c. The author lays out a comprehensive program for the development of the Floridan Keys, to include both economic and recreational aspects. Certainly it would seem that if these alluring little tropical islands, so near to world highways of land, sea and air, could have their mosquito population abated and otherwise be made more suitable for human habitation, humans would be willing enough to inhabit them, either permanently for subsistence or temporarily for rest and recreation.

Science News Letter, September 29, 1934

Ichthyology

AMERICAN FOOD AND GAME FISHES —David Starr Jordan and Barton W. Evermann—*Doubleday, Doran*, 574 p., $5.00. A new edition of a classic so well known to anglers and ichthyologists, to outdoorsmen and scientists generally, that extended comment is unnecessary. Like its predecessors, it is abundantly illustrated.

Science News Letter, September 29, 1934

Physics

TRAVAUX RÉCENTS SUR LES MOLECULES DANS LE SOLEL, LES PLANETES ET LES ÉTOILES—P. Swings—*Hermann et Cie., Paris*, 44 p., 14 francs.

Science News Letter, September 29, 1934

Animal Psychology—Genetics

WORKING DOGS—Elliott Humphrey and Lucien Warner—*Johns Hopkins Press*, 253 p., $3.50. The report of an attempt to produce by selective breeding a strain of German shepherds which combine working ability with beauty. Those interested in animal psychology or just in dogs will find appeal in the discussion of what psychological traits are valuable in dogs and the inheritance of such traits.

Science News Letter, September 29, 1934

Mineralogy

HOW TO COLLECT MINERALS—Peter Zodac—*Rocks and Minerals, Peekskill, N. Y.*, 80 p., $1.00. A boy with his first collector's fever upon him and few available facilities for taking care of what he collects does well by devoting himself to minerals: the first specimens are not easily broken or otherwise damaged. From this, mineral collecting may range on through to careful curatorship of the most fragile crystal growths or the sheer acquisitiveness of the gem fancier. This pamphlet will guide the boy, and also aid the more advanced mineral collector, at least through the earlier stages of the art.

Science News Letter, September 29, 1934

Agricultural Economics

DECLINE AND RECOVERY OF WHEAT PRICES IN THE 'NINETIES—Food Research Institute, 63 p., $1.00; PACIFIC NORTHWEST WHEAT PROBLEMS AND THE EXPORT SUBSIDY—Food Research Institute, 73 p., $1.00. With wheat very much in the public consciousness, at first because there was so much that low prices were ruining the farmers, then because the drought made everyone uneasy lest there be a sudden scarcity, these two new studies of the Food Research Institute are timely and will doubtless be of much interest to students.

Science News Letter, September 29, 1934

Mining

ARIZONA LODE GOLD MINES AND GOLD MINING—Eldred D. Wilson, J. B. Cunningham and G. M. Butler—*University of Arizona*, 261 p., free.

Science News Letter, September 29, 1934

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